Practice: 412 - Grassed Waterway

Scenario: #1 - <35 foot top width

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth, 55% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $3,192.77 **Scenario Cost/Unit:** $3,192.77

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	369.5	$1,344.98
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	369.5	$569.03
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	0.5	$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	0.5	$218.88
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80

Materials

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #2 - 35-55 foot topwidth

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $3,368.89 **Scenario Cost/Unit:** $3,368.89

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	403.5	$621.39
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	403.5	$1,468.74
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	0.5	$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	0.5	$218.88
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58

Materials

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #3 - >55 foot topwidth

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $4,065.60 **Scenario Cost/Unit:** $4,065.60

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	538	$1,958.32
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	538	$828.52
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	0.5	$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	0.5	$218.88
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50

Materials

Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #4 - <35 foot topwidth with checks

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $4,171.88 **Scenario Cost/Unit:** $4,171.88

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	369.5	$1,344.98
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	369.5	$569.03
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	0.5	$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	0.5	$218.88
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						

Materials

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$64.83	14	$907.62
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80

Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$71.49	1	$71.49
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #5 - 35-55 foot topwidth with checks

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gully which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $4,477.66 **Scenario Cost/Unit:** $4,477.66

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	403.5	$621.39
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	403.5	$1,468.74
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	0.5	$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	0.5	$218.88
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						

Materials

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$64.83	16	$1,037.28

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$71.49	1	$71.49

Practice: 412 - Grassed Waterway

Scenario: #6 - >55 foot topwidth with checks

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $5,109.54 **Scenario Cost/Unit:** $5,109.54

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	538	$828.52
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	538	$1,958.32
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	0.5	$215.22
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	0.5	$218.88
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						

Materials

Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$64.83	15	$972.45
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00

Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$71.49	1	$71.49
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #7 - <35 foot top width, crop season construction

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth, 55% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.25' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $4,060.96 **Scenario Cost/Unit:** $4,060.96

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	369.5	$1,344.98
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	369.5	$569.03
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	1.5	$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	1.5	$645.65
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00

Materials

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #8 - <35 foot topwidth with checks, crop season construction

Scenario Description:

Typical practice is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 30' topwidth, 8:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $5,040.07 **Scenario Cost/Unit:** $5,040.07

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	369.5	$569.03
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	369.5	$1,344.98
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	1.5	$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	1.5	$645.65
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00

Materials

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$64.83	14	$907.62
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$71.49	1	$71.49

Practice: 412 - Grassed Waterway

Scenario: #9 - 35-55 foot topwidth, crop season construction

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $4,237.08 **Scenario Cost/Unit:** $4,237.08

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	403.5	$1,468.74
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	403.5	$621.39
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	1.5	$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	1.5	$645.65
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58

Materials

Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #10 - 35-55 foot topwidth with checks, crop season construction

Scenario Description:

Typical practice is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway. Foregone income reflects entire construction area to account for crop loss while constructing during the growing season.

Before Situation:

The field has a small gully which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 45' topwidth, 10:1 side slopes, 1.5' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $5,345.85 **Scenario Cost/Unit:** $5,345.85

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	403.5	$1,468.74
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	403.5	$621.39
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	1.5	$645.65
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	1.5	$656.64
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						

Materials

Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$64.83	16	$1,037.28
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$71.49	1	$71.49

Practice: 412 - Grassed Waterway

Scenario: #11 - >55 foot topwidth, crop season construction

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, 50% excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. The practice is installed using a dozer. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $4,933.79 **Scenario Cost/Unit:** $4,933.79

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	538	$828.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	538	$1,958.32
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Foregone Income						
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	1.5	$645.65
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	1.5	$656.64
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50

Materials

Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28

Practice: 412 - Grassed Waterway

Scenario: #12 - >55 foot topwidth with checks, crop season construction

Scenario Description:

Typical practice is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Stone checks are installed every 100 feet along the length of the waterway perpendicular to water flow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 1 acre, 60' topwidth, 10:1 side slopes, 2.0' depth. Checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Stone checks are installed with small backhoe and labor. Waterway area is fertilized and seeded for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Scenario Feature Measure: Acre of Waterway

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $5,977.73 **Scenario Cost/Unit:** $5,977.73

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acre	$8.12	1	$8.12
Excavation, common earth, large equipment, 50 ft	1222	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.54	538	$828.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$20.46	1	$20.46
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$9.73	1	$9.73
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.52	1	$6.52
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$10.67	1	$10.67
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$3.64	538	$1,958.32
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	$437.76	1.5	$656.64
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	$430.43	1.5	$645.65
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$36.72	1	$36.72
Materials						

Materials

Three Species Mix, Cool Season, Introduced Perennial Grass	2315	Cool season, introduced grass mix. Includes material and shipping only.	Acre	$46.58	1	$46.58
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$26.14	2	$52.28
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.50	90	$45.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.65	90	$58.50
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.62	90	$55.80
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$64.83	15	$972.45

Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	$71.49	1	$71.49
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$494.28	1	$494.28